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YOUNG LARVAE OF *VEROMESSOR PERGANDEI* (HYMENOPTERA: FORMICIDAE: MYRMICINAE)

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Time was when it seemed every myrmecologist wanted to work on *Veromessor pergandei,* but we can find no mention of it in the last eight years of *Zoological Record.* When we lived with it in Death Valley and southern Nevada it became one of our favorite ants.

To differentiate instars we would like the following specimens: a first instar inside an egg; a second instar inside a first instar that is ready to moult; a third instar inside a second ready to moult; etc.; a mature larva; a prepupa. Fortunately our *V. pergandei* material meets all the requirements, except the first. *V. pergandei* is polymorphic, which presents another problem: when does subcaste differentiation begin? How can one tell whether a small larva is the young of a major or a mature of a minim; or whether a medium-sized larva is the mature of an intermediate worker or the half-grown larva of a major? In *V. pergandei* subcaste differences apparently begin in the fourth instar and are manifested only in size.

V. pergandei presents another problem: there are two body shapes for mature worker larvae. We have no explanation for this.

Vermessor pergandei (Mayr)

Figures 1–6.

Egg. Figure 1. About 0.32 × 0.52 mm.

First Instar. Figure 2. Length (through spiracles) about 0.48 mm. Entire larva feebly sclerotized. Body sac-like; head on anterior end and greater in diameter then thoracic somites. Spiracles about 0.006 mm in diameter. No spinules nor hairs on body. Cranium subcircular in anterior view. Antennae represented by 2 sensilla. About 20 head hairs, 0.013–0.025 mm long, unbranched. Mouth parts small. Labrum with a ventrolateral swelling on each half of anterior surface; 2 or 3 sensilla on each half of ventral surface. Mandibles subtriangular; apical tooth straight and sharp-pointed;

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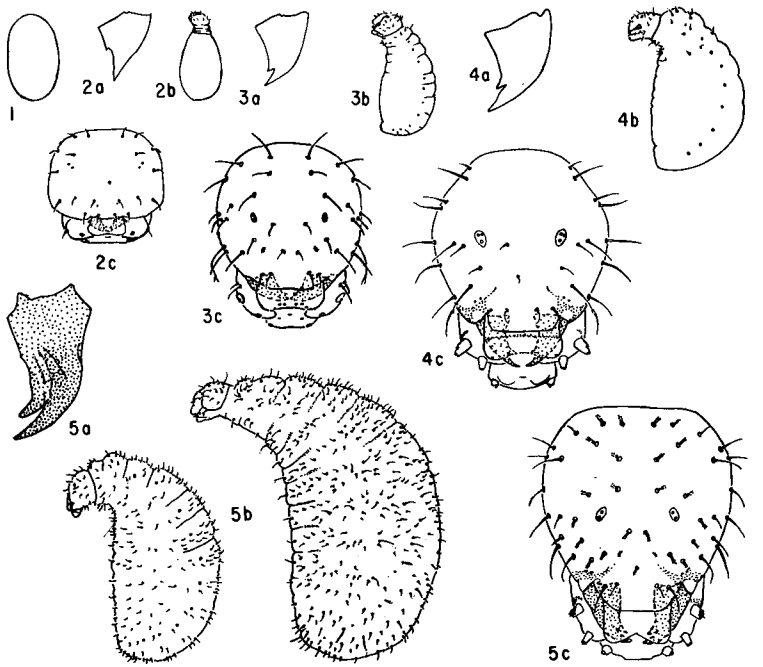


Figures 1–5. Left mandible in anterior view, ×185; larva in side view and egg, ×19; head in anterior view, ×76. 1. Egg. 2. First Instar. 2a, Mandible; 2b, profile; 2c, head. 3. Second Instar. 3a, Mandible; 3b, profile; 3c, head. 4. Third instar. 4a, Mandible; 4b, profile; 4c, head. 5. Fourth Instar. 5a, Mandible; 5b, profiles of two sizes of larvae; 5c, head.

medial border with a small projection. Maxillary palp with 5 sensilla on a slight elevation; galea represented by 2 sensilla. Labium short and wide; palp represented by 5 (?) sensilla.

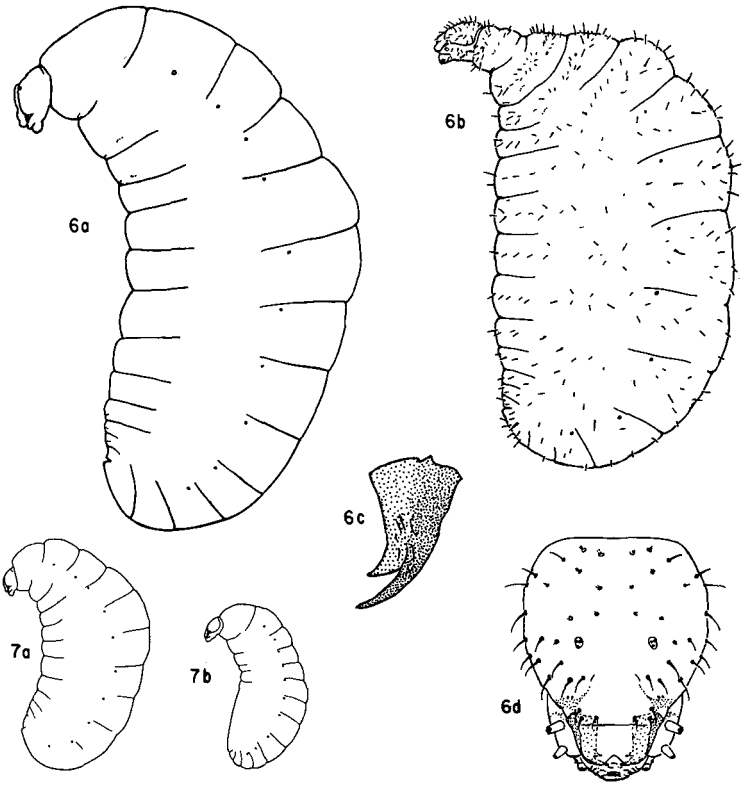
Second Instar. Figure 3. Length (through spiracles) about 1.6 mm. Dorsal profile of body feebly C-shaped, ventral feebly sigmoid; T1–T3 nearly same diameter; AIII–AIV widest, tapering slightly to anterior end and more rapidly to posterior end; head and anus ventral; anus with a small posterior lip. Spiracle diameter about 0.008 mm. Integument with minute spinules in short rows on venter of thorax and all surfaces of AVIII–AX. Body hairs on T1 only; 0.006–0.018 mm long, slightly curved and with frayed tip. Cranium oval, narrowed ventrally; length subequal to width. Antennae with 3 sensilla each. Head hairs few (about 35); 0.006–0.018 mm long, with

short frayed tip. Labrum feebly bilobed; anterior surface of each lobe with a few sensilla near and on ventral surface. Mandible feebly sclerotized. Maxillary palp represented by a cluster of 5 sensilla; galea a slight elevation with 2 sensilla. Labial palp represented by a cluster of 5 sensilla.

Third Instar. Figure 4. Length (through spiracles) 2.4–2.8 mm. Similar to second instar except as follows: Body widest at AIII, venter nearly straight; dorsal profile long and C-shaped. Spiracles about 0.019 mm in diameter. Entire integument with minute spinules in short arcuate rows. Body hairs very few; on thorax only; 0.013–0.028 mm long, with very short-bifid tip. Cranium subhexagonal in anterior view; width and length subequal. About 30 head hairs; 0.013–0.058 mm long, with short 2- or 3-branched tip. Labrum bilobed; each lobe with 2 sensilla on anterior surface; ventral surface with 3 sensilla on each half; posterior surface with 3 sensilla near ventral border of each lobe and with a cluster of 3 sensilla near middle; with small patches of isolated spinules dorsally and near middle. Maxilla with round-pointed apex and with a few short rows of minute spinules; palp a short frustum with 5 sensilla; galea a low rounded knob with 2 sensilla. Labium with small patches of spinules dorsally near middle, the spinules isolated or in short rows; palp a slightly elevated cluster of 5 sensilla; an isolated sensillum between each palp and the opening of the sericteries; the latter a short transverse slit. Hypopharynx with a few minute spinules in short transverse rows.

Fourth Instar. Figure 5. Length (through spiracles) about 3.0–4.9 mm. Similar to third instar except as follows: Body hairs sparse, generally distributed; 0.013–0.1 mm long; with slightly curved shaft and short-frayed tip. About 45 head hairs; 0.012–0.05 mm long. Posterior surface of labrum with rather coarse spinules, isolated or in short rows dorsally. Mandible moderately sclerotized; apical tooth long, narrow and sharp-pointed; subapical tooth shorter and less pointed. Maxillary palp and galea more elevated. Labial palp a low knob with 5 sensilla. Hypopharynx with numerous short transverse rows of minute spinules; upper portion with numerous short ridges [furrows?] converging into pharynx.

Fifth Instar (Mature Larva). Figure 6. Length (through spiracles) 4.3–6.8 mm. Similar to fourth instar except as follows: Body profile pogonomyrmecoid but of two different shapes: (1) stout, with AII and AIII swollen dorsally; (2) abdomen swollen and sac-



Figures 6–7. Fifth Instar (Mature Larva). 6a (hairs omitted) and 6b, profiles, ×19; 6c, left mandible in anterior view, ×185; 6d, head in anterior view, ×76. 7. Profiles of mature larvae to show size range (hairs omitted), ×8. 7a, Major worker; 7b, minor worker.

like, thorax narrowed abruptly and turned ventrally, T1 about same diameter as head length. Otherwise larvae with different profiles similar. Anus with small lips. Leg, wing and gonopod vestiges present. Body hairs with bifid or frayed tip. Antennae small, each with 3 sensilla; at midlength of cranium. Head hairs with slightly curved shaft and 2- or 3-branched tip. Mandibles ectatommoid; heavily sclerotized; apical tooth long and narrowed to a sharp point; subapical tooth at end of medial blade, with stout base and sharp apex. Maxillary palp paxilliform with 5 (4 apical and 1 lateral) sensilla; galea stout and digitiform with 2 apical sensilla. Labium with mi-

nute spinules in short to long arcuate rows which are arranged in subtransverse rows; opening of sericteries a moderately long transverse slit.

Material studied: numerous larvae from Death Valley National Monument, California and Boulder City, Nevada.

In studying the living larvae the following characters will be most useful in distinguishing instars: First instar. Lacks hairs on body. Head hairs few (about 20). Second Instar. Body hairs very few, confined to T1 only. Head hairs few (about 35). Third Instar. Body hairs very few, some on each thoracic somite. Fourth Instar. Body profile lacks distinct neck. Entire integument covered with spinules and hairs, the hairs with short frayed tips. Fifth Instar (Mature Larva). Body profile pogonomyrmecoid. Length 4.3–6.8 mm. Body hairs with short 2- or 3-branched tip.

Summary

The larva of each of five instars of *Veromessor pergandei* is described in detail and illustrated. In the fifth instar there are two types of body profiles. The instars of living larvae may be differentiated by a few easily observed characters.